

## IN THE SPECIFICATION

Please amend the following passages from the specification. Added matter is underlined and deleted matter is struck through.

Please replace the paragraph between lines 4 and 12 on page 2 with the following:

For this reason, in the optical disk recording and reproducing apparatus, there have been high demands for those apparatuses which have a superior correcting capability in the error-correction encoding process in which an error in data reproduced at the time of disk playback areis detected and the erroneous data is restored to correct data. Here, an encoding system in which codes having a great code distance are encoded by doubly combining them has been adopted.

Please replace the paragraph between line 20 on page 2 and line 5 on page 3 with the following:

Main data inputted from a host apparatus in a time sequential manner areis divided into 128-byte units, to these further added addition data of two bytes, and these are arranged in 128 rows independently. Data of one byte on the same position (that is, on the same column) areis collected from 130-byte data in each row so that a first encoding parity of 14 bytes is added thereto. The first encoding parity is arranged along the direction of arrow Q. The first encoding parity thus arranged consists of 14 rows each having 130 bytes. A second coding parity of 8 bytes is added to each column of 142 rows each having 130 bytes thus arranged.

Please replace the paragraph between lines 6 and 17 on page 4 with the following:

Fig. 9(a) shows one example of a data mapping state on a track in the sample servo system. As illustrated in this Figure, servo fields (SF), which are servo areas, are arranged on a spiral track with constant intervals in a discrete manner. Data areis recorded on a data field (DF) between the adjacent servo fields. The physical sector is constituted by a plurality of collected data segments, each of which is formed by a

combination of the servo field and data field. Moreover, an address segment containing address information indicating the position of each physical sector is placed in the data field of the leading segment of the physical sector.

Please replace the passages between line 15 on page 6 and line 10 on page 7 with the following:

Here, the following description exemplifies a case in which information is recorded on the optical disk shown in Figs. 9(a) and 9(b) by using the recording method as shown in Fig. 8. In this case, when data that areis to be recorded on the above-mentioned portions (ends of the data fields) adjacent to the servo fields areis concentrated, for example, on the same column in the two-dimensional array in Fig. 8, the first encoding process in the error-correction encoding operation forms a code system on each column in the two-dimensional array; therefore, in the columns on the data field edge portions on which data areis concentrated, there is a higher possibility of failure in correction in the decoding process of the error-correcting operation, as compared with the coding system of the first encoding process on the other columns.

Moreover, for the reason as described above, if there is an incorrectable error remaining in a column on which data (user data) areis recorded as shown in Fig. 8, it is highly possible that the error causes malfunction in the host apparatus for processing reproduced data from the optical disk recording and reproducing apparatus.

Please replace the passages between line 20 on page 15 and line 18 on page 16 with the following:

Fig. 3(a) is an explanatory drawing that shows the layout of segments on the track of the optical disk. Each segment consists of a data field DF on which a servo field SF having a length corresponding to 2 bytes and data of 50 bytes are recorded. Therefore, in Fig. 3(a), data of 50 bytes are recorded between areas (servo fields SF) formed as concave and convex sections on the substrate. Here, each frame consists of 48 data segments on which data areis recorded and 2 address segments on which address information is preliminarily formed.

Fig. 3(b) is a conceptual drawing that shows the servo field SF of Fig. 3(a). As illustrated in Fig. 3(b), pairs of pits P1 and P2 which are arranged with predetermined intervals in a biased manner in the disk radial direction with respect to the center of the track and pits P3 arranged in the center of the track are formed on the disk substrate as concave and convex sections. Based upon a difference in the quantities of reflected light beams from the pits P1 and P2 at the time when the light beam scans the track, the tracking error signal is generated. Here, the control signal (focusing error signal), used for converging the light beam on the disk recording surface and for scanning the surface, is generated by using reflected light beam from a mirror face within the servo field SF.

Please replace the paragraph between lines 5 and 14 on page 17 with the following:

Here, an explanation will be given of a case in which: user data to be recorded on one logical sector, which is a recording and reproducing unit that is specified by the host apparatus, are set to 2048 bytes, and addition data (attached data indicating characteristics, etc. of the user data, error correction codes for user data, etc.) that are added to the user data of one logical sector by the optical disk recording and reproducing apparatus are set to 16 bytes, and the total 2064 bytes are arranged in a two-dimensional array (172 bytes  $\times$  12 bytes) as one unit.

Please replace the paragraph between line 20 on page 18 and line 3 on page 19 with the following:

Moreover, as described above, in the case when the code sequence is constituted by data and parities successively located at data positions in the diagonal direction starting with the leading data position of the rows, if the lowermost row has been reached before reaching the encoding length of 188 bytes, the sequence returns to the uppermost row, and a coding sequence is again formed by using data and parities successively located at a data position in the diagonal direction.

Please replace the passages between line 3 on page 20 and line 4 on page 21 with the following:

The addition of the control code C forms a two-dimensional array (second two-dimensional array) of 200 bytes  $\times$  192 bytes. Since this description exemplifies a case in which, as illustrated in Fig. 3(a), data are recorded in a data field DF of 50 bytes, in the above-mentioned two-dimensional array, recording data (user data, addition data and first and second encoding parities) corresponding to 4 data segments are contained in each row.

Then, as described above, the recorded data, arranged in the two-dimensional array, are divided into 4-data segments at the time of recording. Moreover, data (user data, addition data), parities (first encoding parity P1, second encoding parity P2) and control code C, which correspond to 12 rows, are recorded on one frame sequentially in the direction of arrow P from up to down.

In a magneto-optical disk having the above-mentioned recording format, recording data of integral multiples (in this case, 4) of the data segment are included in each row in the two-dimensional array. Therefore, data that are to be placed at an end of the data field DF of each data segment in Fig. 3(a) are given as data placed at the leading control code of each row and data placed at column numbers 48, 49, 98, 99, 148, 149 and 198 (where column numbers are allocated to the portion other than the control code C). Therefore, the data to be placed at the end of the data field are concentrated on specific columns in the two-dimensional array.

Please replace the passages between line 21 on page 22 and line 15 on page 24 with the following:

In the case when a control code C of two bytes is inserted into each row so that recording data of integral multiples of the data segment are just contained in each row, the number of bytes of the control code C needs to be changed depending on the number of user data, the number of data in each data segment, etc. Additionally, the control code C is preferably arranged so that at least one portion thereof is located at an end of the data field DF that is comparatively low in the data reliability; thus, it is possible to reduce the probability of the user data being placed at the end portions.

In contrast, in the case when the control code C is not added, for example, the number of data in each data segment is arranged so that data of integral multiplies of the data segment is just contained in each row. In the case of the above-mentioned example, if the number of data in each data segment is 49.5 bytes, then the arrangement is made so that data of integral multiplies of the data segment are just contained in each row, without the need for the addition of the control code C.

As described above, in the present embodiment, supposing that the number of data in the data field DF between the concave and convex areas (servo fields SF) is  $n$  bytes ( $n$ : natural number), all the data including the user data, addition data, the first encoding parities, the second encoding parities and control code C, added on demand, are arranged as a two-dimensional array in which the length of each row  $m$  is represented by  $b \times n$  ( $b$ : natural number). In other words, provision is made so that data that are to be recorded at ends of the data field DF are concentrated on specific rows. In addition to this arrangement, one of the error-correction encoding processes is carried out by using a code sequence constituted by a data alignment in the diagonal direction in the two-dimensional array; thus, it is possible to avoid errors from concentrating on specific coding sequences. Therefore, upon reproducing data from the above-mentioned magneto-optical disk recording and reproducing apparatus, the possibility of the data being corrected by the correction decoding process becomes higher, thereby improving the reliability of the recording data. Here, in the above-mentioned example, the first code sequence is constituted by a data alignment in a diagonal direction; however, a data alignment in any direction may be used as long as the data alignment in the longitudinal direction is not used.

Please replace the paragraph between line 10 on page 26 and line 3 on page 27 with the following:

As illustrated in Fig. 3(b), when a light beam is directed to pairs of pits P1 and P2 (tracking pits P1 and P2) which are arranged with predetermined intervals in a biased manner in the disk radial direction with respect to the center of the track within a servo field SF in the sample servo system, voltage values, which vary in response to quantities of light beams reflected from the tracking pits, are outputted from a photodetector within the optical pickup 3. Moreover, when a light beam is

directed to a mirror face M between the pit P2 and pit P3, the optical pickup 3 is allowed to output a voltage value that varies in response to the degree of focusing onto the disk recording face (the amount of offsets in focusing) that is measured by optical members and the photodetector (not shown) placed in the optical pickup 3. Moreover, in the case when an optical beam is directed onto the pit P3 inside the servo field SF, a voltage value ~~values~~, which varies in response to a quantity of light beam reflected from the pit P3, is outputted from the photodetector.

Please replace the paragraph between line 20 on page 29 and line 16 on page 30 with the following:

Next, an explanation will be given of the processing of recording and reproducing data that constitutes features of the present invention. Here, for convenience of explanation, it is assumed that the host apparatus 200 gives a recording or reproducing instruction to the magneto-optical disk recording and reproducing apparatus with respect to 16 logical sectors constituting an error correction block as one unit. Then, an explanation will be given of a case in which data corresponding to logical sectors of integral multiples of 16 starting with the first logical sector of the 16 logical sectors constituting the error correction block are ~~is~~ recorded or reproduced.

Please replace the paragraph between line 22 on page 30 and line 6 on page 31 with the following:

Fig. 5 is an explanatory drawing that schematically shows the data arrangement on the data RAM 106. As illustrated in Fig. 5, the data RAM 106 at least has a memory space consisting of row addresses of 1 to 192 and column addresses of 1 to 198 that correspond to the recording format of Fig. 1. The user data and addition data corresponding to one logical sector are ~~is~~ arranged in the row addresses 1 to 12 and the column addresses of 1 to 172 of the data RAM 106 (a data storage area corresponding to the first logical sector of 16 logical sectors).